

What is claimed is:

1. A robot arm assembly comprising:

a first link arm including an elongated housing having a first end and a second end, a first non-rotating cam disposed within the housing at the first end and a first four bar link mechanism engageably coupled to the first cam, wherein the first cam is fixedly coupled to a non-rotating shaft mounted co-axially within a first rotating shaft sleeve, wherein the first link arm is coupled to the first rotating shaft sleeve and is rotatable with the first shaft sleeve about the shaft defining a primary pivot axis;

a first translating arm pivotably connected to the second end of the first link arm and pivotably engaged by the four bar link mechanism; and

a first end effector coupled to the translating arm, wherein rotation of the first link arm and shaft sleeve about the shaft mechanically engages the first four bar link mechanism with the first cam and pivotably moves the translating arm about a secondary pivot axis.

2. The robot arm assembly of Claim 1, wherein the first four bar link mechanism comprises:

the link arm housing;

a first cam follower link assembly including a portion pivotably coupled to the elongated housing, wherein the link assembly includes a bearing in contact with the first cam;

a first driver link pivotably coupled at one end to the first cam follower link and is pivotably connected to a first rocker arm at the other end; and

the first rocker arm assembly.

3. The robot arm assembly of Claim 2, wherein the first cam, the first cam follower link, the first driver link and the first rocker link are disposed within the housing of the first link arm.

4. The robot arm assembly of Claim 2, wherein the first rocker arm assembly comprises a rocker arm and a spring, wherein the spring is coupled to the housing of the first link arm and the rocker arm, and wherein the rocker arm is adjustably coupled to the driver link.

5. The robot arm assembly of Claim 4, wherein the spring is adapted to provide a tensile load to the driver link for maintaining constant contact between the first cam follower link and the first cam.

6. The robot arm assembly of Claim 4, wherein the spring is adapted to be elongated to allow the first cam follower link assembly to be pivoted away from mechanical contact with the first cam.

7. The robot arm assembly of Claim 1, further comprising a first motor for translating the first link arm in a vertical direction.

8. The robot arm assembly of Claim 1, wherein the robot arm assembly can substantially move a substrate linearly from a position approximately in a center of a loadlock chamber to a position outside the loadlock chamber.

9. The robot arm assembly of Claim 1, further comprising:

a second link arm including an elongated housing having a first end and a second end, a second non-rotating cam disposed within the housing at the first end and a second four bar link mechanism driven by the second cam, wherein the second cam is fixedly coupled to a second non-rotating shaft sleeve mounted coaxially about the first rotating shaft sleeve and shaft, wherein the second link arm is coupled to a rotatable third shaft sleeve disposed about the second shaft sleeve;

a second translating arm pivotably connected to the second end of the second link arm and pivotably engaged by the second four bar link mechanism; and

a second end effector coupled to the second translating arm, wherein rotation of the second link arm about the second shaft engages the second four bar link mechanism with the second cam and pivotably moves the second translating arm about a secondary pivot axis.

10. The robot arm assembly of Claim 9, wherein the first and second link arms are independently rotatable about the primary pivot axis.

11. The robot arm assembly of Claim 9, wherein the second four bar link mechanism comprises:

the second link arm housing;

a second cam follower link assembly including a portion pivotably coupled to the housing, wherein the second cam follower link assembly includes a bearing in contact with the second cam;

a second driver link pivotably coupled at one end to the second cam follower link assembly and is pivotably connected to a second rocker arm at the other end; and

the second rocker arm.

12. The robot arm assembly of Claim 9, wherein the second cam, second cam follower link assembly, the second driver link, and the second rocker link are disposed within the second link arm housing.

13. The robot arm assembly of Claim 9, further comprising a first motor adapted to translate the first link arm and the second link arm in a vertical direction.

14. The robot arm assembly of Claim 9, further comprising a second motor rotatably engaged with the first rotating shaft sleeve to articulate the first end effector for transporting a first wafer, and a third motor rotatably engaged with the rotatable third shaft sleeve to articulate the second end effector for sequentially transporting a second wafer.

15. A substrate transport mechanism, comprising:

a first link arm;

a second link arm pivotable about a common pivot axis with the first link arm;

a z axis motor for moving the first and second link arms along a z axis; and

a single motor alternately coupled to the first and second link arms for alternately rotating the first link arm and the second link arm about the common pivot axis.

16. The substrate transport mechanism of claim 15, further including:

a first shaft for mounting the first link arm;

a second shaft for mounting the second link arm; and

a clutch for alternately coupling the single motor to the first and second shafts.